

April 23, 2014

Comments on the Draft Final Interim Feasibility Study Report (current FS) for the San Jacinto River Waste Pits Superfund Site (SJRWPS), dated March 2014, provided on behalf of the Port of Houston Authority

Introduction

On behalf of the Port of Houston Authority (PHA), HDR, Inc. has performed a technical review of the Draft Final Interim Feasibility Study Report (Anchor QEA) dated March 2014. The review consists of the following components:

- *HDR's Comments on the Respondents' Tabulated "Responses to USEPA Comments" on the August 2013 FS ("RTC Matrix");*
- *Comments / Questions developed during review of the current FS (General Comments and Specific Comments on the current FS are offered); and*
- *Comments with regard to future tasks - Remedial Design and Long-Term Operations, Maintenance and Monitoring (OM&M) associated with the remedial alternatives considered.*

With each of the above-listed categories of review, HDR has developed comments (and questions / clarification needs) for consideration by USEPA. While the prior comments on the draft FS and prior submittals stand as concerns, this review focuses on our interpretations of the adequacy of the Respondents' responses to EPA's January 15, 2014 comments. Major comments, recommendations, or questions / clarification needs are noted in **bold text** below in this memo and in the attached RTC Matrix. For reference, some of HDR's analysis from the previous Draft FS Review memorandum (October 2013) is repeated below (for purposes of describing modifications made by the PRPs in the current FS document). Depending on the review of FS comments by USEPA, additional information or analysis work may be required for the Final FS Report.

Comments on the Respondents' "Responses to USEPA Comments" on the August 2013 FS

The tabulated format provided by Respondents is useful in summarizing the EPA comments and summary responses. In general, the current FS includes changes that respond to many EPA comments and requests, although some responses are minimal and some are inadequate in our opinion. We have inserted text in the last column (in bold) of the attached RTC Matrix to comment on the adequacy of the proposed responses.



Comments/Question on Current FS

As Background, a summary of the alternatives presented and evaluated in detail in the current FS is provided below for the Site area situated north of I-10 (including TCRA area).

Alternative 1N – Armored Cap and Ongoing OMM (No Further Action), which assumes the Armored Cap (TCRA cap) would remain in place, together with fencing, warning signs and access restrictions established as part of the TCRA, and would be subject to ongoing operation, maintenance and monitoring (OM&M). The estimated cost of this alternative is \$9.5 million (*this alternative and the others presented in the current FS include \$9M for work completed on the TCRA cap*).

Alternative 2N – Armored Cap, Institutional Controls (ICs) and Monitored Natural Recovery (MNR), which includes the actions described under Alternative 1N, plus ICs in the form of deed restrictions and notices, and periodic monitoring to assess the effectiveness of sediment natural recovery processes. This alternative is estimated to cost \$10.3 million.

Alternative 3N – Permanent Cap, ICs and MNR, which includes the actions described under Alternative 2N, plus additional enhancements to the Armored Cap, many of which have already been implemented during the January 2014 efforts, consistent with the USACE recommendations. This alternative will increase the long-term stability of the Armored Cap consistent with permanent isolation of impacted materials (Permanent Cap) and meet or exceed USACE design standards. The Permanent Cap will use rock sized for the “No Displacement” design scenario, which is more conservative than the “Minor Displacement” scenario used in the Armored Cap’s original design. This remedial alternative also includes additional measures to protect the Permanent Cap from potential vessel traffic (e.g., rock berm). This alternative would require an estimated 2 months of construction at an estimated cost of \$12.5 million.

Alternative 4N – Partial Solidification/Stabilization, Permanent Cap, ICs and MNR, which includes the actions described under Alternative 3N; however, about 23% of the Armored Cap (2.6 acres above the water surface and 1.0 acre in submerged areas) would be removed/disposed off-site, and approximately 52,000 cubic yards (cy) of materials with TEQDF,M that exceeds 13,000 nanograms per kilogram (ng/kg), would undergo solidification and stabilization (S/S). After the S/S is completed, the Permanent Cap would be re-constructed and the same ICs and MNR as in Alternatives 2N and 3N would be implemented. This alternative would require an estimated 17 months of construction to complete and is estimated to cost \$23.2 million.

Alternative 5N – Partial Removal, Permanent Cap, ICs and MNR, in which the Armored Cap would be partially removed (as in Alternative 4N) and the same 52,000 cy of material that would undergo S/S under Alternative 4N would instead be excavated for off-site disposal. After

the removal is completed, the Permanent Cap would be re-constructed and the same ICs and MNR that are part of Alternatives 2N to 4N would be implemented. This alternative would require an estimated 13 months of construction at an estimated cost of \$36.1 million.

Alternative 5aN - Partial Removal of Materials Exceeding the PCL, Permanent Cap, ICs and MNR, in which all material beneath the Armored Cap in any location where the water depth is 10-feet or less and which has a TEQDF,M at or above the PCL for a hypothetical recreational visitor of 220 ng/kg (about 137,600 cy) would be excavated for off-site disposal. To implement this alternative, about 11.3 acres (72 percent) of the Armored Cap would be removed to allow for this material to be dredged. After excavation of the material, the remaining areas of the Armored Cap would be enhanced to create a Permanent Cap, and the same ICs and MNR that are part of the preceding four alternatives would be implemented. This alternative would require an estimated 19 months for construction and has an estimated cost of \$77.9 million.

Alternative 6N – Full Removal of Materials Exceeding the PCL, ICs and MNR, in which all material above the PCL of 220 ng/kg located beneath the Armored Cap and at depth (4 ft – 6 ft into sediment bed, to be finalized during design phase) in an area to the west of and separate from the TCRA area would be removed. This would involve removal of the existing Armored Cap in its entirety and the removal of 200,100 cy of material. The dredged area would then be covered with a layer of clean fill. This alternative would require an estimated 16 months of construction at an estimated cost of \$99.2 million.

For reference, the alternatives included in the August 2013 Draft FS were as follows:

- *No Further Action (\$1.3M; includes on-going inspection and maintenance of TCRA remedy. Costs for armored cap design and construction in the TCRA area were not included as “base” costs in the Draft FS)*
- *Institutional Controls (ICs) and Monitored Natural Recovery (MNR); includes on-going inspection and maintenance of TCRA remedy (\$1.6M)*
- *Permanent Cap, ICs, MNR (\$2.9M)*
- *Partial Stabilization/Solidification (S/S), Permanent Cap, ICs, and MNR (\$11.2M)*
- *Partial Removal, Permanent Cap, ICs, MNR (\$24M - \$118M)*
- *Full Removal (all materials exceeding PCLs), ICs, and MNR (\$104M - \$636M)*

The ranges of costs presented in the August 2013 Draft FS for the removal options included (high) costs for incineration of dredged material (thus, the large ranges in the above two bullets). For the current FS, incineration of dredged material is not included in the cost estimates, noting that two landfill facilities were tentatively identified that indicated materials from the SJRWP Site could potentially be disposed of at these locations without incineration. Thus, further consideration of incineration as a component of disposal has been screened out in the current FS Report.

Remedial alternatives were also presented for impacted soils located south of I-10 (Southern Impoundment Area). Evaluation of this area was based on EPA comments on the Draft FS, and is new in the current FS. The alternatives presented for this area of the Site are:

Alternative 1S – No Further Action. This alternative serves as the baseline of comparison for the other remedial alternatives in the area south of I-10. Under this remedial alternative, impacted soil would remain in place and no steps would be taken to alert future landowners or construction workers of the presence of dioxin concentrations exceeding the PCL (at depths ranging generally from 5 ft bgs or deeper). The estimated cost for this alternative, which includes future USEPA 5-year review costs, is \$140,000.

Alternative 2S – Institutional Controls (ICs). Under this remedial alternative, the following ICs would be implemented:

- Deed restrictions would be applied to parcels in which the depth-weighted average $TEQ_{DF,M}$ concentrations in the upper 10-feet of subsurface soil exceed the soil PCL for the hypothetical future construction worker.
- Notices would be attached to deeds of affected properties to alert potential future purchasers of the presence of waste and soil with $TEQ_{DF,M}$ concentrations exceeding the soil PCL.

The estimated cost for this remedial alternative is \$270,000.

Alternative 3S – Enhanced Institutional Controls. This remedial alternative would incorporate the ICs identified in Alternative 2S and add physical features to enhance the effectiveness of the ICs. The physical features would include bollards to define the aerial extent (110,000 s.f. or larger footprint) of the remedial action areas at the surface and a demarcation layer that would alert workers digging in the area that deeper soil may be impacted. Implementation of this remedial alternative may include the following steps:

- Removing up to 2 feet of surface soil
- Temporarily stockpiling the soil on-site
- Installing the demarcation layer (such as a geogrid or similar durable and readily visible material) at the bottom of the excavation
- Returning the soil to the excavation and re-establishing vegetative cover
- Placing bollards at the corners of the remedial action areas

The duration of construction for this remedial alternative is estimated to be 1 month. The estimated cost for this remedial alternative is \$670,000.

Alternative 4S – Removal and Off-Site Disposal. This remedial alternative is included as directed by USEPA and involves excavation and replacement of soil in three remedial action areas. Soil would be removed within these areas to a depth of 10 feet below grade. Implementation of this remedial alternative (as scoped in the current FS) would require dewatering (groundwater lowering) to allow excavation of impacted soil in relatively dry

conditions and may need to be timed to try to avoid high water and periods when storms are most likely. Excavated soil would be further dewatered, as necessary, and potentially treated to eliminate free liquids prior to transporting it for disposal (i.e., at an existing permitted landfill). The excavation would be backfilled with imported soil, and vegetation would be re-established.

According to the current FS, an existing building (an elevated frame structure) and a concrete slab within Remedial Action Area South 3 would need to be demolished and removed prior to excavating the underlying soil. These features would be replaced, if necessary (and restoration costs were included in the FS costing). The removal volume (50,000 cy, as estimated in the current FS) was calculated assuming a conservative excavation side slope of 2 horizontal to 1 vertical. Transportation and disposal costs were estimated assuming that all of the excavated material would be transported to a licensed landfill for disposal. Appropriate containment and controls for dust and runoff would be provided for any soil stockpiles or soil amendment areas that may be required. The duration of construction for this remedial alternative is estimated to be 7 months, and the estimated cost for this remedial alternative is \$9.9 million.

General Comments on Current FS:

In general, the current FS is presented in accordance with USEPA guidance. Site background information, Remedial Action Objectives (RAOs), Applicable or Relevant and Appropriate Requirements (ARARs), development of remedial alternatives, and analysis/comparative analysis of remedial alternatives considering the nine USEPA criteria are presented in text/tabular formats (as was the case with the August 2013 Draft FS). The current FS refers to work presented in previous project deliverables notably the RI, risk assessments, site modeling reports, and the RAM. Information on probabilities of contaminant release during remedy implementation/construction is also included in the FS, based on PRP modeling. **It is recommended that EPA consider whether alternatives with such probabilities of failure are “viable” to include in the FS.**

Alternatives Presented for Area North of I-10

The current FS notes that all Alternatives presented and evaluated for the area north of I-10 meet the threshold criteria (overall protection of human health and the environment; compliance with ARARs). However, the ability of Alternatives 1N and 2N to meet the EPA’s threshold criteria relies on the effectiveness of the existing TCRA Cap (with enhancements that may not yet be fully demonstrated/documented in the field).

The current FS provides alternatives with a better range of costs / timeframes than the August 2013 draft FS did. Costs associated with the alternatives involving dredging/off-site disposal were refined, based on potential off-site disposal facilities that were identified (incineration was thus not included in the current FS alternatives). However, it is acknowledged/implied in the current FS that costs for some remedy items (procuring land for storage, staging,

dewatering/treatment) will need to be refined in the future during remedial design, depending on the remedy selected by EPA. In general, costing appeared to have been conducted consistently across the alternatives.

The approaches noted in the alternatives for the TCRA containment/enhancements should be in accordance with all EPA and USACE recommendations, and revisions to the alternative description and cost estimate should be reflected in the Final FS Report to the satisfaction of EPA.

The description of the ICs and MNR in Alternative 2N is important since they are also elements of Alternatives 3-6. ICs described in the text (restrictions on dredging and anchoring, deed restrictions, public notices, and signage) are consistent in concept with ICs employed at other Superfund sites. Importantly, a periodic sampling and analytical program would be implemented under Alternatives 3N-6N to monitor the progress of natural recovery. **Finalization of such ICs – and monitoring program - will need to be refined with USEPA and stakeholders during the design phase (after a remedy is selected). ICs should be designed so that they do not or minimally interfere with existing aquatic and land uses in the area.**

The current FS (again) states that Alternatives 4N, 5N, 5aN, and 6N each offer less environmental benefit or reduction in risks, greater uncertainties related to implementation, an extended construction schedule, higher short-term impacts, increased safety risks, higher community impacts, and significantly greater costs. Below are comments on the PRPs' analysis of alternatives with regard to the FS criteria (many of these points were noted in prior comments).

- **ENVIRONMENTAL BENEFIT / RISK REDUCTION.** It has been noted that all of the remedial alternatives carried forward for detailed evaluation can meet the two threshold criteria of Protection of Human Health and the Environment, and Compliance with ARARs. As such, the argument that Alternatives 4N, 5N, 5aN, and 6N fail to offer sufficient benefit / risk reduction is unfounded. These types of remedies (treatment, removal) have been successfully designed, implemented, and monitored / maintained to ensure RAOs are met at several Superfund sites across the U.S.
- **UNCERTAINTIES RELATED TO IMPLEMENTATION.** Higher uncertainties during implementation are inherent in more robust remedies; however, proper design should account for this. In the current FS, the PRPs present probabilities of a 3-yr storm occurring during implementation of treatment and removal remedies (and deleterious effects that may occur due to contaminant resuspension). Case Studies are also presented in the current FS (Table 4-3) to document such impacts. However, technologies / remedies that are more complex in nature should not be precluded from serious consideration because they often – as is the case here – provide higher levels in reduction of contaminant toxicity, volume, and/or mobility which are

important considerations for long-term permanence. In the case of the SJWPSS Site, EPA may consider a phased approach to remedy implementation (such as setting a construction season so as to not coincide with the typical “storm season”); work in discrete areas of the larger remedial footprint at a time, while providing more clean backfill (residuals cover) as part of dredging alternatives (in the current FS, Alternatives 5aN and 6N include a volume of clean backfill that is approximately 10 % of the overall dredged quantity); and working contingencies into remedial design and monitoring to reduce the probability of impacts during remedy build-out. Such measures will increase overall remedy costs and durations, but would help mitigate potential deleterious effects during construction.

Sediment remedies involving capping and dredging continue to be selected at many sites in the Superfund program, and include extensive design and OM&M to insure remedial goals are being achieved.

- INCREASED SAFETY RISKS. Worker safety concerns associated with any remedial alternative should be appropriately addressed in the Remedial Design phase of the project (after remedy selection) and with detailed H&S Plans. Complex remedial actions – at other Superfund sites and including the TCRA implementation at the site – have documented that safety concerns can and should be appropriately addressed. It is noted also that safety risks are not one of the nine USEPA FS balancing criteria (but can be presented as part of short-term impacts or implementability criteria).

Additional comments are included in the RTC Matrix attached to this memorandum.

Alternatives Presented for Area South of I-10

The current FS notes that soil Alternatives 2S, 3S, and 4S will meet the threshold criteria. Alternative 1S (No Further Action) does not. The estimated cost for Alternative 3S is \$670,000 while that for Alternative 4S (Removal and Off-Site Disposal of Soil) is **\$9.9M**. It is noted that the removal alternative includes work in 3 areas, based on soil data with elevated dioxin levels and appears to extrapolate to “clean” sample points (or midpoint of adjacent “clean” sample points), for an estimated soil removal quantity of 50,000 cy. Removals of an 800 s.f. structure and 9,700 s.f. of concrete pad (with restoration of both) are also included in Alternative 4S.

As commented upon for the review of the August 2013 Draft FS, a better range of remedial alternatives / costs should be presented for the impoundment area south of I-10. It is suggested that limited hot-spot soil excavation can occur at the 3 areas, but only extend to building foundations (without encompassing removal/restoration of structures), while installing the demarcation barrier and enhanced ICs as presented in Alternative 3S. This scenario would provide an alternative that incorporates elements of the two alternatives and bridges the large cost differential.

Specific Comments / Questions developed during review of the current FS

Executive Summary

Specific comments offered below on the Executive Summary are also applicable to other sections of the current FS document.

Executive Summary p. ES-9, 2nd paragraph: The text does not adequately reflect model limitations. The following revised text should be considered by EPA:

Such releases have been hypothetically evaluated with models that show that if the existing cap is assumed to have no releases, releases during implementation of Alternatives 4N, 5N 5aN, or 6N could result in increased fish tissue concentrations of contaminants for several years following completion of dredging (Patmont et al. 2013). Such increases however, might be offset by lower concentrations in later years after implementation of these alternatives. Moreover, the conservative design necessary to overcome the higher level of uncertainty associated with the implementation of these removal/disposal alternatives can result in significant cost increases.

Executive Summary, p. ES-10, 2nd full paragraph: EPA should require revision of this paragraph as follows:

If any of these Alternatives has deficiencies in implementation or OM&M, water quality impacts, worker safety risks, and air emission impacts will result. The models used show that impacts are estimated to be more than 8 to 20 times greater² for Alternatives 4N, 5N, 5aN, or 6N than for Alternative 3N.

Executive Summary, p. ES-11: EPA should require that the characterization of the Figure be revised as follows:

Figure ES-1 compares the overall project cost and projected effectiveness based on the modeled hypotheses for each of the alternatives discussed above.

Executive Summary, p. ES-12, last paragraph of section: EPA should require that the Respondents delete the end of the paragraph as no analyses were performed to support this opinion of impacts without construction releases. Furthermore, only EPA should determine ultimate cost effectiveness.

Section 4 – Development of Remedial Alternatives

Section 4.1.2, p. 37: This section and all alternatives that include MNR should specify: MNR will include sampling and analyzing sediment quality for parameters, locations and depths specified by EPA. If erosion occurs, or surface sediment quality exceeds PCLs, EPA shall require a response action and time of response appropriate to the condition.

Section 4.1.3, p. 37: This section emphasizes the negative aspects of treatment and does not offer an objective summary of treatment. While there are limitations to any technology, its benefits in immobilizing contaminated material to minimize future releases must be recognized and balanced against the possible impacts of implementing the removal. EPA should direct Respondents to modify this section.

Section 4.1.4, p. 40, end of section: Use of bollards or sheeting should be considered for protection of the cap from future barge / vessels.

Section 4.1.5, pp. 40-41: This section does not provide a useful or objective summary of removal. While there are limitations to any technology, its benefits in removing the most contaminated material to prevent future releases must be recognized and balanced against the possible impacts of implementing the removal. EPA should direct Respondents to modify this section. For example, replace last full paragraph on p. 41 with:

Operational and engineering controls (rigid and flexible barriers) would be used to the extent practicable to mitigate these potential releases. Experience gained from prior projects is expected to improve results over that achieved in prior projects, although some leakage, accumulation of resuspended sediments at the base of the walls and other technical limitations are recognized (USACE 2008b; Anchor Environmental 2005; Anchor QEA and Arcadis 2010). Flexible barriers such as turbidity curtains control particles larger than the mesh size, although smaller particles and any minimally soluble contaminants may penetrate the silt curtain. (USACE 2008a; USACE 2008b; Francingues and Palermo 2006; Anchor Environmental 2005; Anchor QEA and Arcadis 2010). Proper design and installation of engineered barriers would be critical for minimizing the issues described above.

Section 4.2, p. 44, Alternative 1N: This alternative (and all others) should include navigation restrictions as ICs in areas with contaminants that should not be disturbed by propeller action as well as anchoring, especially on the northwest side of the site.

Section 4.4.3, p. 60, 4th bullet: Soil should not be returned to the excavation if contaminant concentrations in the excavated soil exceed surface PCLs or exceed other waste management criteria.

Section 4.4.3, p. 60 (and other passages in the FS): Citing injury risks and potential fatalities are not relevant to FS or to decision making; the text should simply state that no significant injuries or fatalities are projected.

Section 5 – Detailed Analysis of Remedial Alternatives

Section 5.1.1.2 p. 65 (and other discussions of proposed ICs in the FS): Consideration of water

quality impacts should reference others' data because the Respondents chose not to collect any surface water quality data for the RI.

Section 5.1.1.3 p. 66 (and other discussions of ICs in the FS): The potential disturbance of contaminated sediment by tug boats or other boats is not addressed by any alternative; it should be. EPA should direct that ICs to limit navigation in contaminated areas be included in all alternatives; EPA should specify where such ICs should be imposed.

Remedial Design and Operation, Maintenance and Monitoring (OM&M)

It is noted that subsequent to remedy selection by USEPA, and after the Record of Decision (ROD) is issued, the remedial design phase will start. The below paragraphs offer comments related to post-ROD design and OM&M. Some are applicable to the finalization of the FS Report.

DESIGN

The remedy selected in the future – such as TCRA Cap enhancements, permanent capping, treatment, removal, or a combination of approaches north of I-10, and enhanced ICs/soil removal south of I-10 – is required to undergo a detailed design prior to construction. **The designs should utilize site-specific information, recommendations from Federal Agencies and other stakeholders, and include the best criteria and modeling in the design (e.g., wave runoff; overtopping; storm / flood stage; flow rates; flow velocity and erosion potential; sedimentation; storm surge; wind loadings) to ensure that the most effective and permanent remedy is constructed for protection of human health and the environment, and for the benefit of the many existing and future uses of the area.**

It is recommended that a pre-design investigation (PDI) be conducted, particularly for the area north of I-10, to confirm physical nature of sediments, condition of site area (topography / bathymetry), and extents of COCs in sediment/soil exceeding PCLs. The PDI would provide recent information for the remedial design phase, such as if contaminant levels in surface sediment and soil have been affected by land use (e.g., new upland asphalt installed; local dredging) or weather events (flooding; alterations in channel geometry), which may have spread or incidentally contained contamination. The MNR periodic sampling program can also be refined during the PDI. Institutional controls (ICs, such as fencing, signage, and buoys) and best management practices (BMPs, such as erosion control, silt curtains, stormwater pollution protection) associated with the selected remedy can be more fully scoped during the PDI, as well.

OM&M

As alluded to earlier in this memo, TCRA issues/concerns that have been identified reinforce the need for a well-planned OM&M program over the life of the selected remedy at the site. It is understood that an in-depth operation, maintenance and monitoring program will be needed

- To verify selected remedy is in-place and functional
- To verify sediment and tissue concentrations post-remedy

Such monitoring program will need to be scoped and formulated in the remedial design, and should incorporate input from USEPA and stakeholders. Items to be scoped include, but are not limited to,

- Key parameters to be inspected (rock wall, liners)
- Means and frequency of inspections and reporting
- Corrective action triggers and plan
- Natural Recovery monitoring (e.g., sediment/tissue sampling; sediment deposition rates)
- Verification of ICs (including site management plans to be followed if excavation or dredging is planned for contamination areas)

References

AQ. 2013. Draft Final Interim Feasibility Study Report: San Jacinto Waste Pits Superfund Site. Prepared by Anchor QEA, LLC., Ocean Springs, Mississippi, plus appendices. March, 2014.

NTSB "Pipeline Special Investigation Report – evaluation of pipeline functions during flooding and of spill response, San Jacinto River near Houston Texas." PB96-917004 NTSB/SIR-96/04, September 6, 1996.

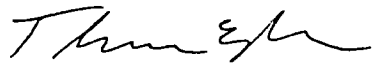
USGS Fact Sheet "Floods of Southeast Texas October 1994," FS 94-073, January 1995.

Any questions concerning these comments should be communicated to Linda Henry, Port of Houston Authority.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael P. Musso". The signature is fluid and cursive, with the first name "Michael" being the most prominent.

Michael Musso, P.E., M.S., MPH
Senior Project Manager

A handwritten signature in black ink, appearing to read "Thomas Pease". The signature is fluid and cursive, with the first name "Thomas" being the most prominent.

Thomas Pease, P.E, PhD
Senior Project Manager

cc: Neil McLellan, Tom Pease (HDR)